

Unit 6

Rational Expressions

Day 1

Simplifying, Multiplying and Dividing

Rational Expression- is the quotient of two polynomials, in which the denominator can not have a value of the variable that will make it become zero.

Finding the restrictions (domain) of a rational expression:

1) $\frac{3}{x+2}$

$$x+2 \neq 0$$

$$\underline{\underline{x \neq -2}}$$

Finding the restrictions (domain) of a rational expression:

2)

$$\frac{x+4}{x^2+3x+2}$$

$$x^2+3x+2 \neq 0$$

$$(x+2)(x+1) \neq 0$$

$$x \neq -2 \quad x \neq -1$$

Finding the restrictions (domain) of a rational expression:

$$3) \quad \frac{2a-5}{2a^2+1}$$

$$2a^2+1 \neq 0$$

$$2a^2 \neq -1$$

No restrictions

Simplifying:

$$4) \quad \frac{32a^2b^5}{10ab^7} = \frac{16a}{5b^2}$$

Simplify:

5)

$$\frac{x+2}{x^2+5x+6} = \frac{\cancel{(x+2)}}{(x+3)\cancel{(x+2)}} = \frac{1}{x+3}$$

Simplify:

6)

$$\frac{6-3k}{k^2-4} = \frac{3(2-k) \overset{(-1)}{\cancel{(-1)}}}{\cancel{(k-2)}(k+2)} = \frac{-3}{k+2}$$

Multiplying Rational Expressions:

7)

$$\frac{\cancel{8}x^{\cancel{4}}}{\cancel{5}x\cancel{y}^2} \cdot \frac{\cancel{10}y^{\cancel{2}}}{\cancel{12}x^2} = \frac{4x}{3y}$$

$$\frac{80x^4y}{60x^3y^2} = \frac{4x}{3y}$$

Multiplying Rational Expressions:

8)

$$\frac{3x+6}{2x^2-7x+3} \cdot \frac{2x^2-15x+7}{x^2-5x-14} = \frac{3(x+2)}{(x-1)(x-3)} \cdot \frac{(x-1)(x-7)}{(x-7)(x+2)}$$
$$= \frac{3}{x-3}$$

Dividing Rational Expressions:

$$\begin{aligned} 9) \quad \frac{10x^3}{30x^4} \div \frac{50x^5}{20x^3} &= \frac{10x^3}{30x^4} \cdot \frac{20x^3}{50x^5} = \frac{200x^6}{1500x^9} \\ &= \frac{2}{15x^3} \end{aligned}$$

Divide:

10)

$$\begin{array}{l} \text{A} \quad 3p^2 + 11p - 4 \\ \text{B} \quad 24p^3 - 8p^2 \end{array} \div \begin{array}{l} \text{C} \quad 9p + 36 \\ \text{D} \quad 24p^4 - 36p^3 \end{array} = \frac{\text{A} \quad \cancel{(3p-1)} \cancel{(p+4)}}{\text{B} \quad \cancel{8p^2} \cancel{(3p-1)}} = \frac{4p^3(2p-3)}{24p^2} = \frac{p(2p-3)}{6}$$

$$\begin{array}{l} \text{D} \quad 4 \\ \text{A} \quad \cancel{2} p^3 (2p-3) \\ \text{C} \quad \cancel{9} (p+4) \\ \text{B} \quad 3 \end{array}$$

$$\frac{\text{A}}{\text{B}} \cdot \frac{\text{D}}{\text{C}}$$

$$\frac{2}{15} + \frac{7}{10} \quad \left| \quad \frac{2}{15} \cdot \frac{2}{2} + \frac{7}{10} \cdot \frac{3}{3}$$

$$\frac{4}{30} + \frac{21}{30} \quad \left| \quad \frac{4}{30} + \frac{21}{30}$$

$$= \frac{25}{30}$$

$$GCF = 3 \cdot 5 \cdot 2$$

$$GCF = 30$$

$$\frac{x}{x^2+3x+2} + \frac{2x-3}{x^2-1} =$$

$$\frac{x}{(x+1)(x+2)} \cdot \frac{(x-1)}{(x-1)} + \frac{(2x-3)}{(x-1)(x+1)} \cdot \frac{(x+2)}{(x+2)}$$

$$\frac{x^2-x}{(x+1)(x+2)(x-1)} + \frac{2x^2+x-6}{(x+1)(x+2)(x-1)} = \frac{3x^2-6}{(x+1)(x+2)(x-1)}$$

LCD $(x+1)(x-1)(x+2)$

HOMEWORK:

p 51-52: 1-8 (all), 12-36 (even)